What is claimed is:

1. A method for achieving transient, localized, modulation of vascular structure and/or function, comprising:

topically administering to a patient in need of said modulation, a sufficient amount of material comprising semi-crystalline poly-β-1→4 N-acetylglucosamine polymers, wherein the polymers are free of protein, substantially free of other organic contaminants, and substantially free of inorganic contaminants, and wherein said administering induces at least one transient, localized physiological response selected from the group consisting of stimulation of endothelin-1 release, vasoconstriction, and reduction in blood flow out of a breached vessel,

whereby the patient experiences transient, localized modulation of vascular structure and/or function.

2. The method of claim 1, wherein the physiological response comprises stimulation of endothelin-1 release.

3. The method of claim 2, wherein the endothelin-1 is released from vascular endothelial cells.

4. The method of claim 1, wherein the physiological response comprises vasoconstriction.

5. The method of claim 1, wherein the physiological response comprises reduction in blood flow out of a breached vessel.

6. The method of claim 1, wherein the poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 150,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation, and said polymer has a molecular weight of about 10,000 daltons to about 30 million daltons.

7. The method of claim 6, wherein the poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 50,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation, and said polymer has a molecular weight of about 10,000 daltons to about 10 million daltons.

8. The method of claim 7, wherein the poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 10,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation, and said polymer has a molecular weight of about 10,000 daltons to about 2 million daltons.

9. The method of claim 8, wherein the poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 4,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation, and said polymer has a molecular weight of about 10,000 daltons to about 800,000 daltons.

10. The method of claim 6, wherein the semi-crystalline poly-β-1→4 N-acetylglucosamine polymer comprises at least one N-acetylglucosamine monosaccharide that is deacetylated, and wherein at least 40% of said N-acetylglucosamine monosaccharides are acetylated.

11. The method of claim 1, wherein the patient is a human.

12. The method of claim 1, wherein the material is in the form of a gel, sponge, film, membrane, foam, spray, emulsion, suspension, or solution.

13. The method of claim 1, wherein the material is applied directly to a blood vessel.

14. The method of claim 1, wherein the vascular structure is a blood vessel selected from the group consisting of capillary, vein, and artery.

15. The method of claim 14, wherein the blood vessel is a breached blood vessel.

16. The method of claim 15, whereby the patient experiences cessation of bleeding.

17. The method of claim 1, wherein the extent of the transient, localized modulation of vascular structure and/or function is substantially proportional to the amount of semi-crystalline poly-β-1→4 N-acetylglucosamine administered.

18. A biodegradable, non-barrier-forming material comprising semi-crystalline poly-β-1→4 N-acetylglucosamine polymers comprising about 50 to about 150,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation, free of protein, substantially free of other organic contaminants, substantially free of inorganic contaminants, and having a molecular weight of about 10,000 daltons to about 30 million daltons.

19. The material of claim 18, wherein the semi-crystalline poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 50,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation and has a molecular weight of about 10,000 daltons to about 10 million daltons.

20. The material of claim 18, wherein the semi-crystalline poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 10,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation and has a molecular weight of about 10,000 daltons to about 2 million daltons.

21. The material of claim 18, wherein the semi-crystalline poly-β-1→4 N-acetylglucosamine polymer comprises about 50 to about 4,000 N-acetylglucosamine monosaccharides covalently attached in a β-1→4 conformation and has a molecular weight of about 10,000 daltons to about 800,000 daltons.

22. The material of claim 18, wherein the semi-crystalline poly-β-1→4 N-acetylglucosamine polymer comprises at least one N-acetylglucosamine monosaccharide that is deacetylated, and wherein at least 40% of said N-acetylglucosamine monosaccharides are acetylated.

23. The material of claim 18, wherein the material is a gel, sponge, film, membrane, foam, spray, emulsion, suspension, or solution.

24. A method for treating a patient having a vascular disorder, comprising: topically administering to a patient in need of such treatment, a sufficient amount of material comprising semi-crystalline poly-β-1→4 N-acetylglucosamine polymers, wherein the polymers are free of protein, substantially free of other organic contaminants, and substantially free of inorganic contaminants, and wherein said administering induces at

least one transient, localized physiological response selected from the group consisting of stimulation of endothelin-1 release, vasoconstriction, and reduction in blood flow out of a breached vessel, whereby the patient experiences transient, localized modulation of vascular structure and/or function,

whereby said administering ameliorates said vascular condition.

25. The method of claim 24, wherein the vascular disorder is selected from the group consisting of menorrhagia, cerebral aneurysm, abdominal aneurysm, uterine fibroid lesion, and blood vessel puncture.